I claim:

1. A tubular reactor for conducting chemical reactions having exothermic heat of reaction comprising:

at least one thermally conductive reactor tube extending between at least two tube plates in a heat exchanger shell;

said reactor tube having an open feed end for introducing reactants to a reaction zone in the interior of said reactor tube and an open exit end for conducting reaction products from said reactor tube;

said thermally conductive reactor tube having an exterior heat transfer tube surface between said tube plates and within said heat exchanger shell; and

said exterior heat transfer tube surface having at least one heat pipe heat transfer device on it for conducting said exothermic heat of reaction from said thermally conductive reactor tube at essentially isothermal conditions.

2. The tubular reactor of claim 1, wherein said reactor tube has a length and a portion of said reactor tube length corresponds to a hot spot in said reaction zone characterized by heat generation which exceeds the average heat generation per unit of reactor tube length and wherein said heat pipe heat transfer device is positioned on said hot spot.

3. The tubular reactor of claim 1, wherein said reactor tube has a length and said heat pipe heat transfer device is on said reactor tube over substantially its entire length.

4. The tubular reactor of claim 1, wherein said reactor tube has a length, said heat exchanger shell contains a fluid reservoir for holding a liquid heat transfer fluid in a portion of said heat exchanger shell, said reactor tube extends through said fluid reservior, and said heat pipe heat transfer device is on said reactor tube where it extends through said fluid reservior and also extends along the length of said reactor tube beyond said fluid reservoir thereby enabling

heat transfer fluid in said fluid reservoir to be wicked from said fluid reservoir by said heat pipe heat transfer device to an adjacent portion of said reactor tube.

5. The tubular reactor of claim 4, wherein said heat exchanger shell contains a plurality of spaced apart fluid reservoirs for holding liquid heat transfer fluid and said thermally conductive reactor tube extends through said plurality of fluid reservoirs, thereby defining a heat pipe heat transfer zones between said fluid reservoir.

6. The tubular reactor of claim 5, further comprising a means for conveying liquid heat transfer fluid to said fluid reservoirs.

7. The tubular reactor of claim 1, wherein said reactor tube is vertical in said heat exchanger shell.

8. The tubular reactor of claim 6, wherein said reactor tube is vertical in said heat exchanger shell.

9. The tubular reactor of claim 1, wherein said heat exchanger shell has a heat transfer fluid inlet for conveying liquid heat transfer fluid to said reactor tube and a heat transfer fluid outlet for conveying evaporated liquid transfer fluid from said heat exchanger shell.

10. The tubular reactor of claim 6, wherein said heat exchanger shell has a heat transfer fluid inlet for conveying liquid heat transfer fluid to said reactor tube and a heat transfer fluid outlet for conveying evaporated liquid transfer fluid from said heat exchanger shell.

11. The tubular reactor of claim 1, wherein said heat pipe heat transfer device comprises a porous heat transfer surface on said reactor tube.

12. The tubular reactor of claim 6, wherein said heat pipe heat transfer device comprises a porous heat transfer surface on said reactor tube.

13. The tubular reactor of claim 11, wherein said porous heat transfer surface is augmented by porous fins.

14. The tubular reactor of claim 12, wherein said porous heat transfer surface is augmented by porous fins.